

# TECH LAYOFFS

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## 1. Introduction:

Our goal was to select a dataset of tech layoffs that would give prospective employees useful data on the state of the job market in the sector. We chose this dataset in an effort to give job seekers data-driven insights that can improve their comprehension of the trends and patterns in tech layoffs and possibly guide their career or job search strategy. Our aim is to visualize tech layoffs since covid in different locations along with the date and to utilize categorical variables to analyse patterns across different fields a company belongs to.

**Tools Used:** R and Power BI

### **Layoffs Dataset:**

Data Source: Kaggle

Link: <https://www.kaggle.com/datasets/swaptr/layoffs-2022>

no. of rows: 1761

Variables: (9 variables)

1. company: Name of company
2. location: Location of company (City)
3. Industry: Type of company (Retail, Finance etc) (Categorical)
4. Total\_laid\_off: No. of employees laid off (Numerical)
5. Percentage\_laid\_off: percentage of employees laid off by the company (Numerical)
6. date: date of layoff (Date)
7. Stage: Stage of funding (Post-IPO, unkown etc) (Categorical)
8. Country: Location
9. funds\_raised: Funds raised by the company (in Millions \$) (Numerical)

We have utilized two other datasets to support our visualizations and provide reasons to layoffs:

#### a. **CPI:**

Link: <https://www.kaggle.com/code/fit4kz/u-s-inflation-analysis-in-r>

Variables -

- a. Yearmon: Date
- b. CPI: Consumer Price Index (type double)

#### b. **GDP:**

Link: <https://www.macrotrends.net/countries/USA/united-states/gdp-gross-domestic-product#:~:text=U.S.%20gdp%20for%202021%20was,a%205.42%25%20increase%20from%202017.>

Variables –

- a. Date: date
- b. GDP (Billions of US \$): Total GDP in dollars (Type Int).
- c. Per Capita (US \$): GDP per capita (Type Int).
- d. Annual % Change: GDP % change annually (Type Int).

## 2. Exploratory Analysis:

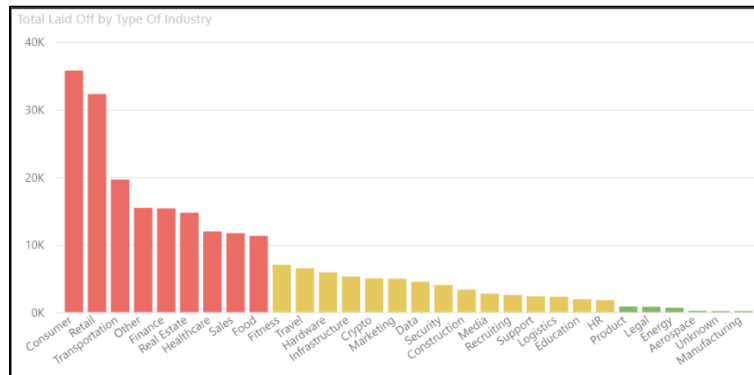
Here is a summary of the datasets utilized:

```
> df_layoff <- read.xlsx("C:/Users/nachi/desktop/data_viz/PROJECT_VIZ/Layoff_cleaned.xlsx")
> df_cpi <- read.csv("C:/Users/nachi/desktop/data_viz/PROJECT_VIZ/US_CPI.csv")
> df_gdp <- read.csv("C:/Users/nachi/desktop/data_viz/PROJECT_VIZ/united-states-gdp-gross-domestic-product.csv")
> summary(df_layoff)
  company      location      industry  total_laid_off  percentage_laid_off      date      stage      country
Length:1494 Length:1494 Length:1494 Min. : 3.0 Min. :0.0000 Min. :2020-03-11 00:00:00.00 Length:1494 Length:1494
Class :character Class :character Class :character 1st Qu.: 35.0 1st Qu.:0.0000 1st Qu.:2020-05-26 00:00:00.00 Class :character Class :character
Mode :character Mode :character Mode :character Median : 75.0 Median :0.1100 Median :2022-06-29 00:00:00.00 Mode :character Mode :character
3rd Qu.: 160.0 3rd Qu.:0.2300 3rd Qu.:2021-12-05 01:47:57.10
Max. :12000.0 Max. :1.0000 Max. :2023-02-03 00:00:00.00

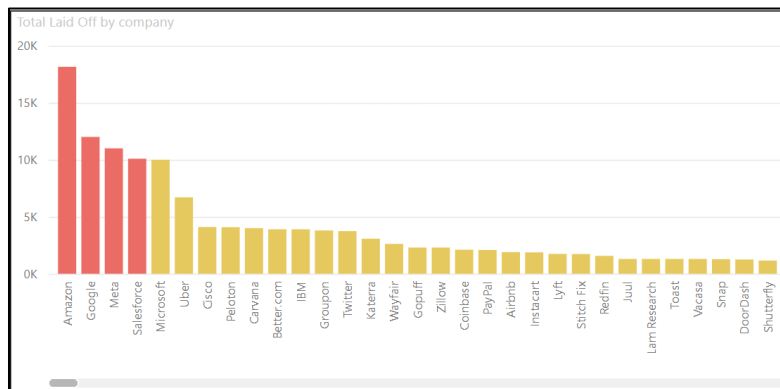
  funds_raised      Custom
Min. : 0.0 Length:1494
1st Qu.: 36.0 Class :character
Median : 132.0 Mode :character
Mean : 925.1
3rd Qu.: 423.0
Max. :121900.0
> summary(df_cpi)
  Yearmon      CPI
Length:1303 Min. : 9.70
Class :character 1st Qu.: 17.45
Mode :character Median : 33.10
Mean : 82.64
3rd Qu.:147.75
Max. :273.00

> summary(df_gdp)
  date      GDP...Billions.of.US... Per.Capita..US... Annual...Change
Length:62 Min. : 5433.3 Min. : 3007 Min. : -2.768
Class :character 1st Qu.: 1732.0 1st Qu.: 7999 1st Qu.: 2.010
Mode :character Median : 6060.6 Median :24115 Median : 3.100
Mean : 7915.6 Mean :27417 Mean : 2.986
3rd Qu.:13621.5 3rd Qu.:45757 3rd Qu.: 4.447
Max. :23315.1 Max. :70249 Max. : 7.237
NA's :1
```

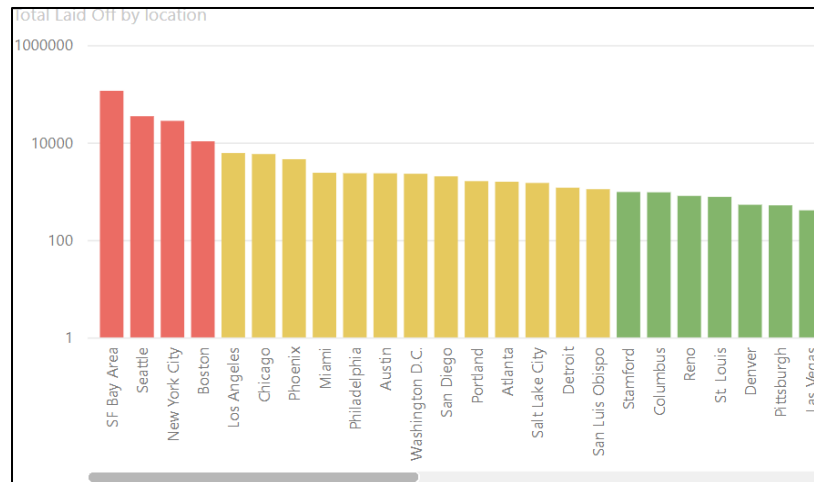
Further we utilized Power BI's power query to clean the data. To remove missing values, and sort few discrepancies related to geographic location names. Created "Measures" to calculate sum total of layoffs. The data types of each column was verified and altered. The date timestamp was set to MM/DD/YYYY.



In this Visualization we can see the number layoffs that have happened in different industry sectors The colour grade represents High Value – Red; Medium Value – Gold; Low Value: Green.



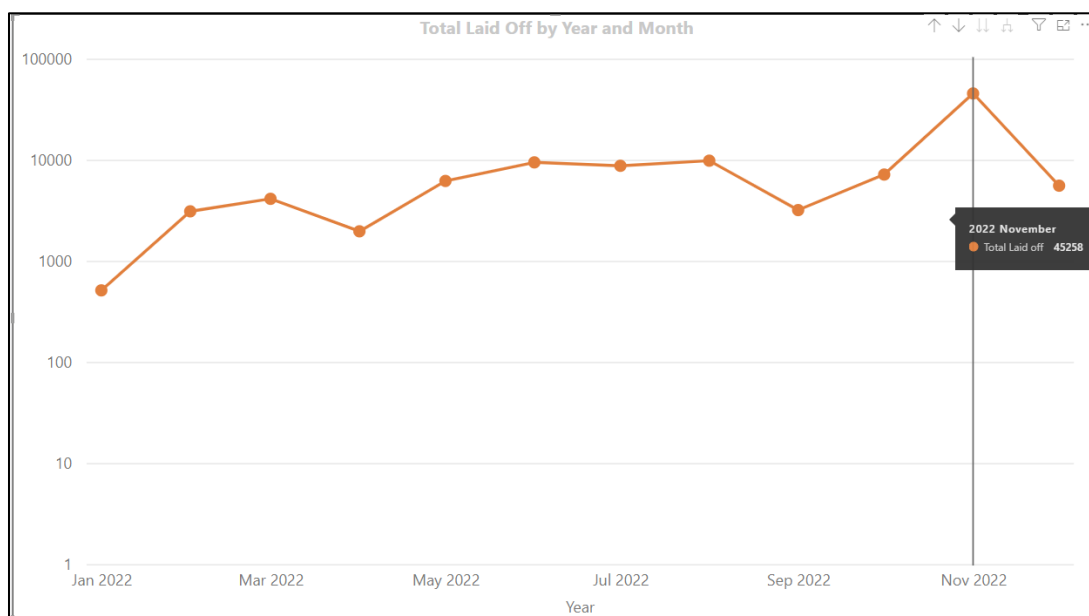
In this Visualization we can see the number layoffs that have happened in different Companies. The colour grade represents High Value – Red; Medium Value – Gold; Low Value: Green.



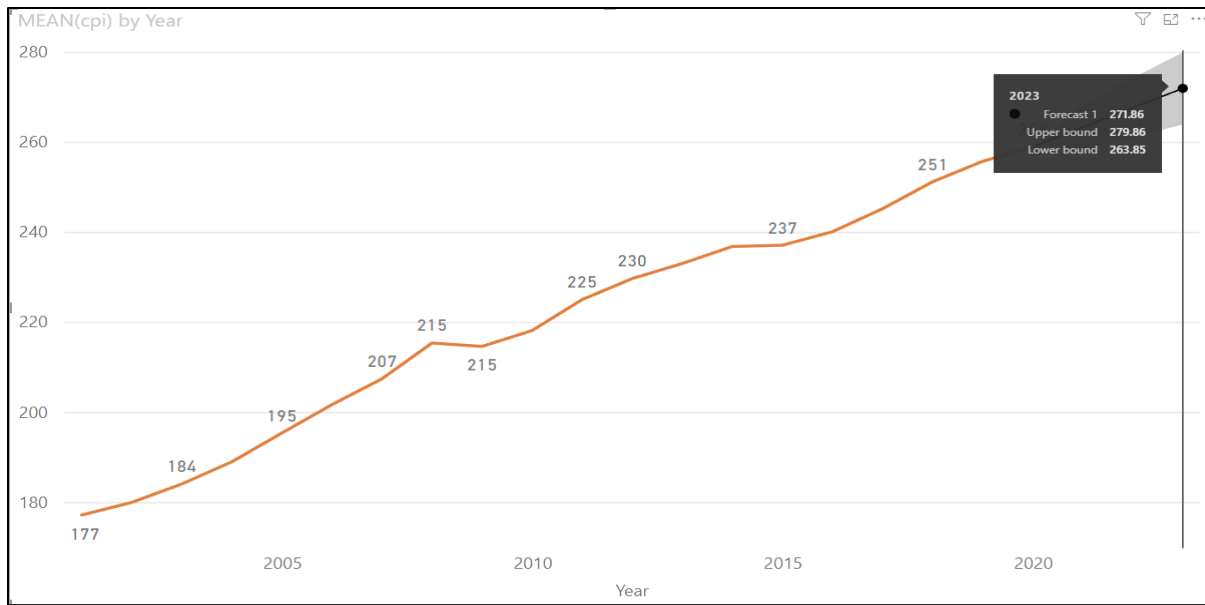
In this Visualization we can see the number layoffs that have happened in different cities of the states. The colour grade represents High Value – Red; Medium Value – Gold; Low Value: Green.

### 3. Visualizations

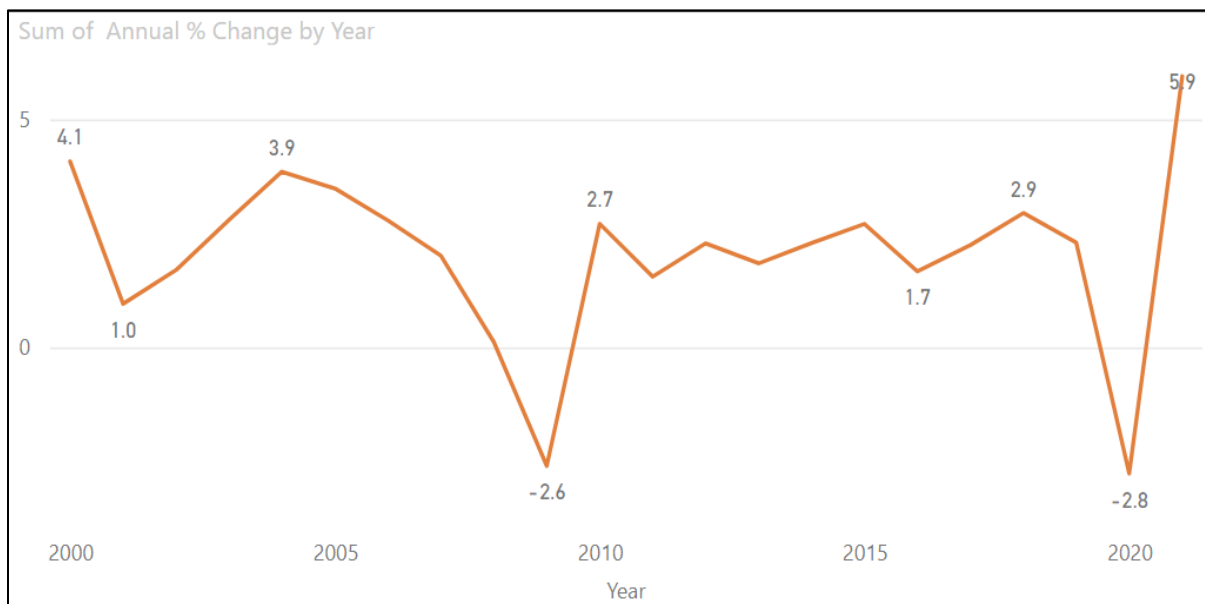
#### Time series trends:



This visualization represents a trend in monthly tech layoffs for the year 2022 in the states. The Y-axis uses a logarithmic scale. The months June, July, August, and November show cased the highest number of layoffs in the year 2022.

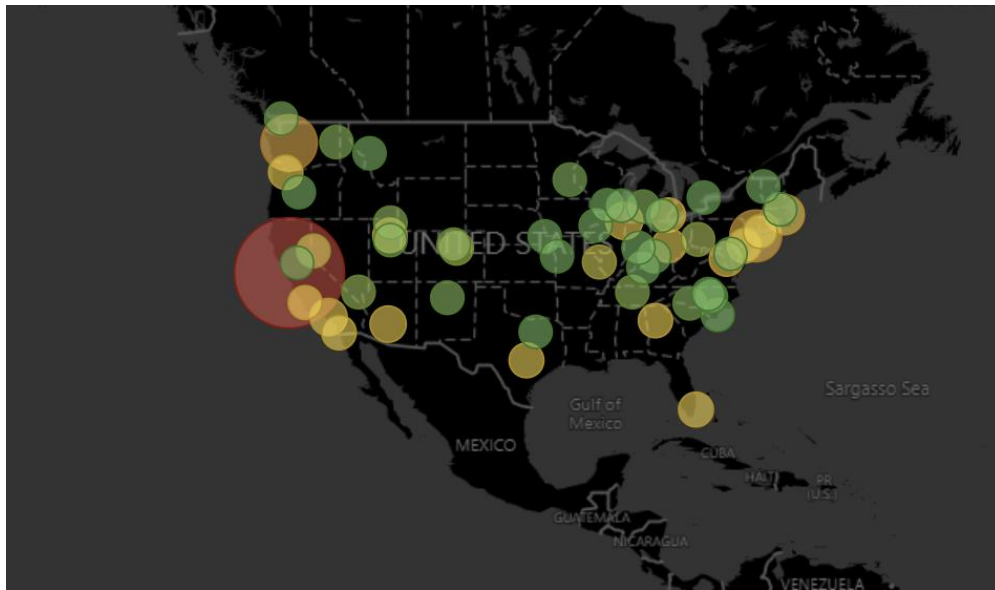


This time series graph represents the trend in average annual CPI (Consumer Price Index) from the year 2001 to 2023. The 2023 CPI has been forecasted to show an increase up to 279.86. The trend depicts that the CPI is ever likely to increase.



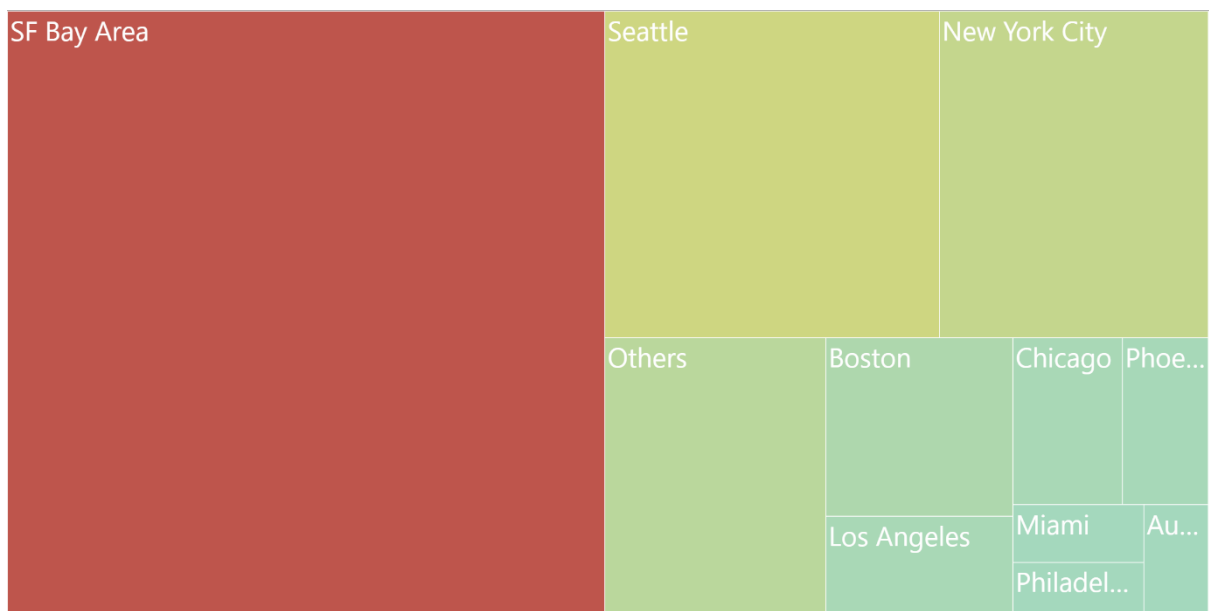
This time series graph represents the annual % change in GDP(Gross Domestic Product). In 2020 we can see the impact of COVID were the % change dropped to -2.8 and the following year showed a growth of 5.9%.

### Geographic Layout:



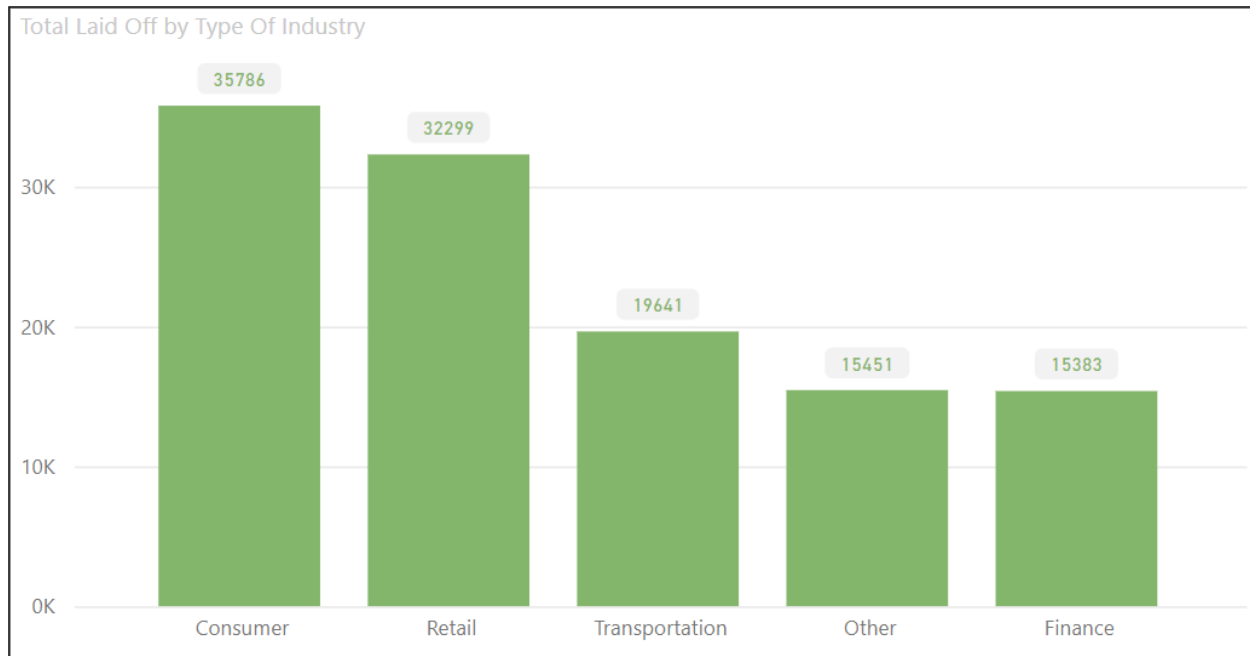
This Geographic plot depicts the layoffs that have happened in major cities. The size of the bubble represents the number of layoffs and also the colour represents higher than 1000 – gold, lower than 1000 in green and maximum as red.

### Tree map Layout of Major cities with high number of Layoffs:

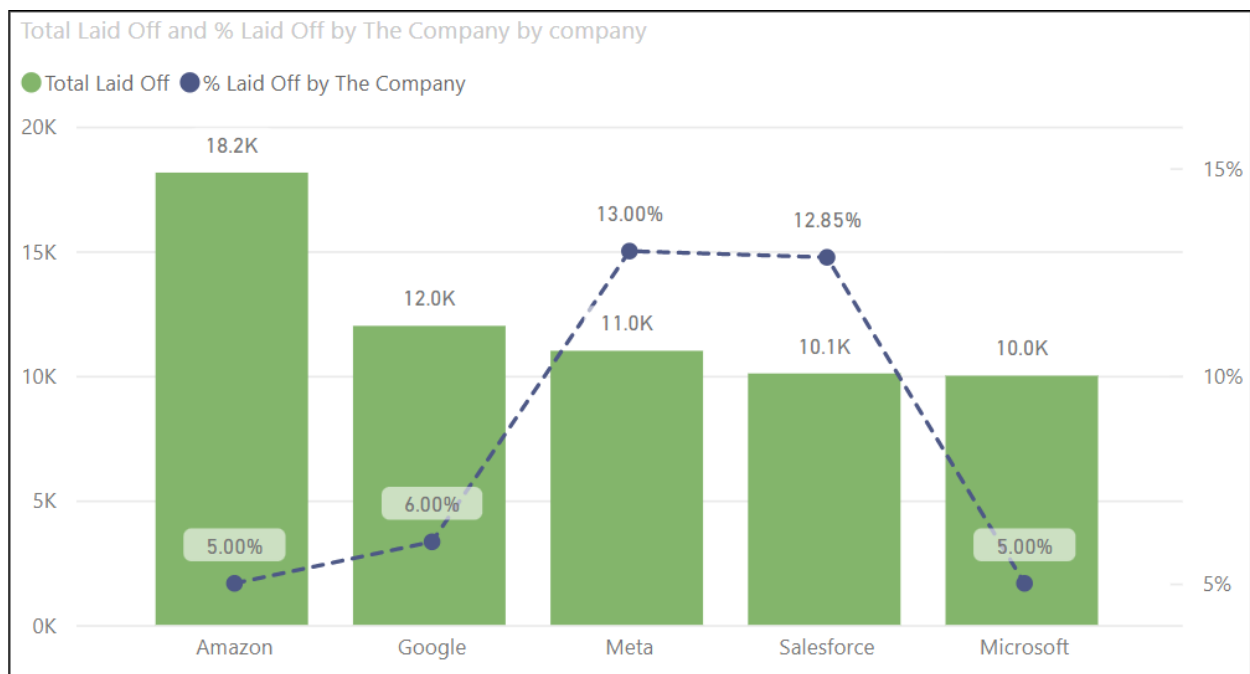


This plot represents the layoffs scale in top ten major cities. As we can see SF Bay Area had the highest number of layoffs followed by Seattle and New York City.

### Categorical Plots:



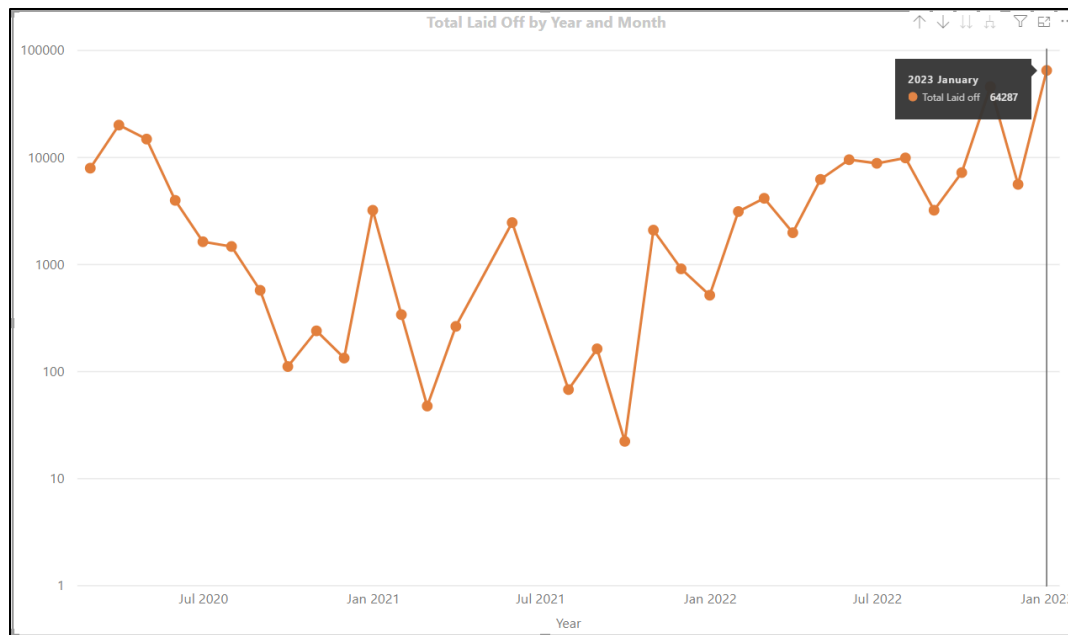
Top 5 industries that had the greatest number of Layoffs in the year 2022. Consumer and Retail had the highest number of Layoffs.



The top 5 companies that contributed to the greatest number of Layoffs in the year 2022. Amazon and Google contributing the highest. The Line represents the total percentage of employees laid off by that company. Meta and Salesforce had more than 12% of its employees laid off.



#### Time Series Trend from 2020 to Jan 2023:



#### 4. Analysis and Discussion:

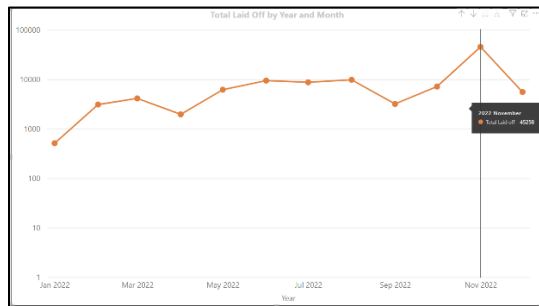
The CPI and GDP can both have an impact on Tech layoffs. Increases in the cost of conducting business, particularly the cost of labour, might result in layoffs when the CPI increases. In addition, if customers have less money to spend as a result of inflation, they might spend less on technology-related goods and services, which might affect the revenues of tech firms and result in job losses. The pandemic had a substantial effect on the tech sector as well; some businesses had to lay off employees as a result of decreased demand for their goods and services. The pandemic caused supply chains around the world to be disrupted, consumer spending fell, and businesses invested less, all of which hurt the tech sector. Lockdowns and other steps intended to stop the virus's spread also forced some computer companies to temporarily halt operations.

Over 200,000 people have been affected by the 2022 tech layoffs, and the wave continues in 2023, with over 60,000 new job cuts in January alone. Considering the average number of tech employees in the year 2022 of 8.9 million ([Source](#)) the percentage laid off was approximately 2%.

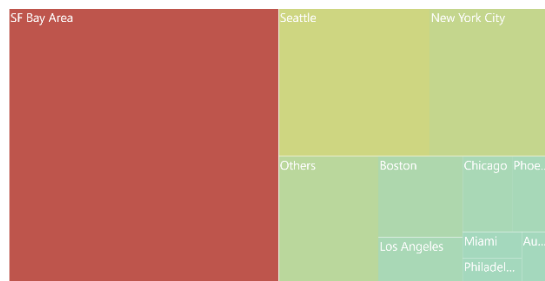
The consumer and retail market were significantly impacted by the COVID-19 pandemic, which caused widespread layoffs and reduced revenue for many businesses in these sectors. The pandemic led to a sharp decline in consumer demand and foot traffic to physical stores, which affected many retailers' bottom lines. Amazon one of the largest global consumer markets laid off 5% of its totally employees in the year 2022.

Google and Meta were the next companies to lay off almost 23000 workers. The southern San Francisco Bay Area of California's Silicon Valley, which is home to several tech businesses, had the largest number of layoffs when the geographical distribution of layoffs was taken into account. laying off an incredible 115,000 workers.

## 5. INDIVIDUAL REPORT:



In this time series graph first I filtered the date to 2022 and set a logarithmic scale on the Y-axis since the change in layoffs is very high between the months and to represent a rising trend I utilized the logarithmic scale.



For this graph I created a new column based on the top ten cities with highest number of layoffs and other cities under “Others”. Then plotted the layoffs based on cities into a tree map. Also gave divergent colour grade that represents the following high- red, middle value – gold and lower values – green.

**Future Analysis:** With more detailed data combining key factors such as reasons for layoffs and economical downfalls combined could definitely give us deeper and more accurate analysis into the current situation and also help us predict such economic trends that could happen.

**Key Takeaways:** This project enabled me to work on visualizations from the perspective of the audience and gain insights into the current economic situation and job market. Additionally, the project helped me to connect with team members and guide them through using the Power BI tool aspects such as how to create calculated columns, measures and coding using DAX and power query, while also collaborating on new ideas to create visualizations that are appealing to a broad audience.

**Reflection:** The course provided me with a more comprehensive understanding of various types of visualizations and their effectiveness in conveying a message. Moreover, the course introduced me to a new tool, Tableau, and new R libraries that were instrumental in developing diverse types of visualizations. I found the exploration of different univariate plots particularly interesting, as they can effectively reveal the distribution of data within a dataset. The homework assignments and tutorials augmented my knowledge of R and helped me to generate various types of visualizations suited for different situations.